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ABSTRACT

During the past five years, student enrollments in Connecticut have declined by approximately 17%. Recent State Department of Education projections indicate that the decline can be expected to continue and become more evident in the high schools through 1989. Continuing declines in both enrollment and available resources raise questions about the quality of education, school size, and the efficacy of school consolidation. The purpose of this study was to identify indicators of quality education and to compare Connecticut's small schools with their larger, non-city counterparts. School districts were compared on the basis of size with respect to costs, staffing, curriculum, achievement, attendance/dropout rates, and graduate preparation. The study concludes that there was no significant difference between small and large districts with respect to expenditure per pupil, although small districts did pay higher educational tax rates. There was also no significant difference with respect to attendance, or percentage of students in need of additional help in basic courses. Small districts with no high schools showed a significantly higher average daily attendance rate. There was little difference among districts with respect to high school persistence rates, mean scores, or percentage of students above the Stated Level of Expected Proficiency on the Ninth Grade Proficiency Examination, but small and medium high schools showed a tendency for higher test scores. While large high schools consistently offered more advanced courses, small schools consistently had a larger number of staff per 1,000 students. Larger high schools had a higher percentage of students who continued on to higher education than small schools. This document contains 28 references and 8 tables. (TES)

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A Comparative Study of the Relationships Between School District Size and Selected Indicators of Educational Quality

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Prepared for:

Connecticut Association of School Administrators:

Small/Rural Schools Committee

February 12, 1986

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Executive Summary

Over the past five years, student enrollments in Connecticut have declined by approximately 17%. Recent State Department of Education projections indicate that the decline in enrollment can be expected to continue and become more evident in the high schools through 1989. Continuing declines in enrollment and available resources raise questions about the quality of education which can be offered by those systems already small in size and about the efficacy of consolidating small school systems. Very little substantive research has been conducted on the advantages and inherent qualities of either large or small schools.

The purpose of this study was to identify indicators of quality education and to compare Connecticut's small schools with their larger, non-city, counterparts on the basis of those indicators. In this study, a "small" school district included any Connecticut public school district with fewer than 2,500 students. A "small" high school is defined as having fewer than 150 students per grade. Schools included in the various samples utilized in this report are listed in the Appendices.

The major areas in which the literature indicates that advantages are claimed either by small or large school districts can be categorized as follows:

1) Costs
2) Staffing
3) Curriculum
4) Achievement
5) Attendance/dropout rates
6) Extra-curricular participation
7) Graduate preparation.

School districts in Connecticut were compared on the basis of size with respect to each of the above categories except extra-curricular participation. All data used in this study was obtained from the most recent data available the Connecticut State Department of Education. As no data was available for extra-curricular participation, it was not included in the analysis.

Summary of Major Findings

In summary, the major findings related to the specific research questions guiding this research found on page 18 of this report are:

1. There is no significant difference between small and large districts with respect to the cost of educating a student (Per Pupil Expenditure), or the ability to pay (Equalized Net Grand List Per Capita and Per Capita Income). Small districts do pay a higher Educational Tax Rate than large districts.

2. There is no significant difference between small and large districts with respect to the percentage of students in need of additional help in math, reading, or writing as indicated by the 1985 Fourth Grade Mastery Test.

3. There are no significant differences among small, medium, or large high schools with respect to the average daily attendance. Small districts that have no high schools have a significantly higher average daily attendance than districts with small, medium, and large high schools.

4a. There are no significant differences among districts with small, medium, or large high schools with respect to ninth through twelfth grade persistence rates.

4b. There are no significant differences among small, medium, or large high schools with respect to mean scores or the percentage of students above SLOEP on the Ninth Grade Proficiency Examination.

4c. Large high schools consistently offer more advanced courses than small or medium high schools.

4d. Small schools consistently have a larger number of high school staff per 1,000 students than large schools.

4e. Large high schools have a higher percentage of students who continue on to higher education than small high schools.

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Introduction

Over the past five years, student enrollments in Connecticut have declined by approximately 17%. Recent State Department of Education projections indicate that the decline in enrollment can be expected to continue and become more evident in the high schools through 1989. Continuing declines in enrollment and available resources raise questions about the quality of education which can be offered by those systems already small in size and about the efficacy of consolidating small school systems. Very little substantive research has been conducted on the advantages and inherent qualities of either large or small schools. Results of past research efforts have been confusing and sometimes misleading.

> The supporting evidence is incomplete -- many critical questions and potential liabilities are simply ignored... The conclusions are, at best, inconclusive, and, at worst, simply incorrect. In short, there is no strong empirical base to support the assumptions and assertions of school and district reorganization advocates (Sher & Tompkins, 1976).

Recently the state of Illinois came under fire because of State Board of Education recommendations for consolidation based on their claims that larger schools result in increases in student achievement, more comprehensive course offerings, and cost economies

(Illinois State Board of Education, 1985). The Illinois Association of School Boards has voted to oppose any efforts toward consolidation unless they are specifically designed to improve instruction (Education Week, 12-11-85, p.2). In the absence of overwhelming evidence linking school size and achievement, it appears the controversy will persist.

Because approximately 67% of Connecticut's school systems can be described as small or rural, there is a need for a study which begins to systematically build an empirical base focusing on the quality of education which small school systems can offer in comparison to the larger school systems in Connecticut.

The purpose of this study is to identify indicators of quality education and to compare Connecticut's small schools with their larger, non-city counterparts on the basis of those indicators. In this study, a "small" school district will include any Connecticut public school district with fewer than 2,500 students. A "small" high school is defined as having fewer that 150 students per grade. Schools included in the various samples utilized in this report are listed in the Appendices.

The study is divided into four sections: review of literature, methodology, discussion, and summary and recommendations.

Review of Literature

This section will review prior research focusing on the effectiveness and quality of education in small school districts. Factors that impact on the overall operation along with the educational quality will be discussed.

Much of the existing literature either focuses too narrowly on selected variables (i.e. costs, while ignoring educational implications) or simply comes to inaccurate conclusions based on the data presented (Clements, 1970). It becomes apparent that there is a wide diversity of opinion concerning the effect of school district size on the quality of education.

Based on previous research about consolidation (Campbell, 1964), proponents of larger consolidated districts claim that students benefit from larger schools through a more varied curriculum, better facilities and course offerings, the opportunity to participate in a more varied extra-curricular program, and wider social opportunities and experiences. In addition, they claim that attendance is more regular as a result of being transported "door to school." They also claim that parents benefit through reduced costs and the community benefits through closer ties with neighboring communities.

On the other hand, proponents of small districts claim that students of small schools benefit from fewer breaks in their education by attending different school buildings at

various stages of their education, closer contact with teachers who know the community and families well, wasting less time being transported on the school bus, and more opportunities to participate in extra-curricular activities. Parents benefit by having more opportunity to participate in the governance of the school, and the community benefits by having a more active school which serves as a community educational and cultural center. They also claim a greater sense of community cohesion and participation, especially in youth activities.

These types of arguments recur throughout the literature (Sher & Tompkins, 1976) and can be generally categorized as follows:

1) Costs
2) Staffing
3) Curriculum
4) Achievement
5) Attendance/dropout rates
6) Extra-curricular participation
7) Graduate preparation.

The remainder of this section will discuss each of these variables as they relate to the effective operation of the school and the educational outcomes. In addition, some of the effects of these variables on community involvement will be discussed where there is appropriate evidence or data.

Costs. The reduction of costs through increased purchasing power is one of the most frequent arguments in favor of large schools. This, however, is a rather simplistic viewpoint and many factors tend to cloud the issue. For instance, while it is true that certain economies on unit prices do exist, the added costs of administration, purchasing, and distribution are frequently not included in the comparisons. These potential offsetting costs, labeled "diseconomies" by Sher & Tompkins, are often ignored (Sher & Tompkins, 1976).

Increased transportation costs are another example of potential diseconomies frequently ignored by relevant research. A study of schools in Oklahoma (White & Tweeten, 1973) estimated "optimal" district size using only educational costs. But that optimal size actually decreased by approximately 16% when increases in transportation costs (more busses and drivers, higher fuel costs, etc.) were included.

Economies and diseconomies also exist in the area of personnel. One study (Cohn, 1968) indicates that small schools have lower pupil-teacher ratios than large schools, hence small schools have proportionately higher staff costs. However, extensive research shows that larger schools tend to have higher teacher salaries thus eliminating at least part of the savings realized through consolidation (Sher & Tompkins, 1976). Per Pupil Expenditures (PPE) is an adequate

index for evaluating the allocation of funds directly related to personnel and instructional expenditures. Caution is advised in using PPE to compare schools. Many other factors may account for differences in the PPE (Fox, 1981).

In the final analysis, general comparisons between small and large schools with respect to cost are difficult at best due to many confounding factors. While indicators such as per pupil expenditure, transportation costs, personnel costs, and the costs of buildings and facilities are useful to identify general trends, the unique characteristics of each district must be examined to determine the efficiency of small schools in delivering a quality educational program.

Staffing ratios. The ratio of teachers to students is an important indicator of the potential quality of education in a school. In a meta-analysis of studies examining the impact of class size on student achievement, Glass and Smith (1978) found that when class ratios of students to teachers are less than 15:1, significant gains in student achievement begin to emerge. Consequently, schools with a greater number of teachers for the same number of students (that is, a lower student-teacher ratio) are in a better position to offer an educational program with the potential for greater gains in student achievement. In addition, since salaries for certified professional staff constitute a very large percentage of the annual school budget, the size of the

staff in relation to the number of students can be a fairly accurate measure of the amount of support a community is willing to give to education (Conant, 1967).

In a study of approximately 2,000 high schools, Conant (1967) found that the chances of having adequate course offerings in a comprehensive high school were best when the staff-student ratio was 17.5:1 or less. He states that "unless a principal can boast of a ratio as low as 17.5:1, he is not likely to be in a position to offer calculus, four years of a modern language or provide adequately for instruction in English composition." While the "ideal" ratio may be a point of debate, it could be argued that lower ratios may contribute to higher student achievement and closer school-community ties.

Readers should note that many factors contribute to increased achievement and better school-student-community relations. Schools with lower staffing ratios are in a better position to positively influence these outcomes because teachers in small schools generally have better relations with their pupils, know their pupils better, and know the parents better than teachers in larger schools (Tyson, cited in Clement, 1970).

Curriculum. Proponents of large consolidated schools tend to claim that large schools are capable of offering a greater range of courses. By providing more varied course offerings, students have greater flexibility in choosing

courses to fulfill their graduation requirements and future career objectives. It would seem that large schools do have an edge.

A study of high school course offerings in Illinois (1985) found that large schools more frequently 1) have longer foreign language sequences, 2) offer calculus, 3) offer selected non-required courses such as geography, and 4) offer more opportunities for remedial math and English.

Students in large schools tend to have more flexibility in selecting courses than students in small schools. Even where small schools offer approximately the same courses, scheduling difficulties with "singleton" courses may arise. For instance, even though a small school may offer calculus, there are so few students who take it that it is scheduled for only one time slot (a "singleton") or in alternate years. Consequently, students of small schools may be in the dilemma of having to choose another course over calculus in order to get all the courses they need or want for graduation. Large schools, on the other hand, may offer calculus in more than one time slot diminishing the probability of schedule conflicts.

Small schools, however, tend to be more stringent in their graduation requirements (Albrecht & Duea, 1983). For example, 70% of the smallest schools (total school enrollment < 100 students) required students to take general science or biology, but only 8% of those with enrollments

over 1,000 required biology and 23% required general science.

Few can argue that larger schools, due to larger enrollments and resources, may offer more varied courses. The more important question may be how many students actually complete them. A 1980 survey of high school diploma requirements shows that while only eight states require high schools to offer a a foreign language, none require students to take it (USA Research, 1984). Furthermore, courses such as algebra, French I, and geography are frequently offered in secondary schools. However, only 31% complete algebra, 13% complete French I, and 16% complete geography. Calculus is offered in schools enrolling about 60% of all students, but only 6% of all of all students complete it (USA Research, 1984).

While it is important to make comparisons of course offerings, the reader should recognize the importance of looking at the percentage of students who actually complete those courses and then weigh the relative importance of course offerings and completions.

Achievement. In any determination of the effectiveness of schooling, student achievement is one of the most frequently used indicators of the extent to which a school fulfills its function. Measures of student achievement, when properly aligned with planned objectives and instruction, are considered to be a type of "report card" that indicates

how well a school is doing. The relationship of school size and achievement has been investigated often with mixed results.

In reviewing studies of the impact of school size on the quality of education, James and Levin (1970) have found either no significant relationships or a negative one between student enrollments and the levels of achievement. However, they point out that there are questionable aspects of every study and that the results are not conclusive. For instance, a recent study by the Illinois State Board of Education (1985) found that schools with enrollments of less than 215 students and more than 1280 students had lower achievement levels than schools with enrollments between 215-493 and 494-1279. While they report a significant difference in achievement with respect to enrollment, it is not made clear if these differences are statistically significant. The means as presented in their tables "look" different, but no evidence is provided to indicate whether the differences might be due to random fluctuations. In addition, the methods of analysis are not clearly defined. In the absence of such information, their results must be viewed cautiously.

The Small Schools Task Force in Montgomery County, Maryland (1973) concluded from its study of elementary school size and achievement "that school size is not the determining factor in the quality of a child's elementary

school education. Other factors such as leadership of the principal, abilities and dedication of the staff, and community support and involvement may be more important factors." In further support of factors other than school size, Cusick (1982) in his report to the National Commission on Excellence in Education states that "the critical factor which differentiates a good school from one not so good is the orientation of the majority of the students toward superior academic education." Clearly, factors other than mere size have a tremendous influence on "superior academic achievement."

Findings such as these emphasize that one must consider that although achievement may be used as an indicator of quality education, many factors in addition to enrollment must be considered before attempting to make causal statements about student achievement.

Attendance/Dropouts. A number of studies indicate that there is a negative correlation between the size of an organization and the attendance rates of its members (Indik, 1961; LeCompte & Barker, 1960; Tallachi, 1960). As poor attendance contributes to a higher dropout rate, it would follow that larger schools might experience a higher dropout rate.

A nationwide study of 1980 high school sophomores found that approximately 15% dropped out of school before graduating (NCES, 1984). The relationship of school size to

rate of dropouts, however, has not been firmly established. In a study of dropout rates in 272 Mississippi high schools, mixed results were obtained. While a comparison of small and large high schools showed that the large schools did indeed have a significantly higher dropout rate, schools that included grades 7-12 in the same building or on the same campus and had an enrollment greater than 400 students had the lowest dropout rates of all (Merritt, 1983).

Further research in this area is needed before any consistent trends emerge.

Extra-curricular activities. Extra-curricular activities seem to have a very positive effect on the outcomes of schooling.

> The National Federation of State High School Associates states that national surveys show that students who participate in high school activities are more likely to have a higher grade average and a far better attendance record. In fact, of students who drop out of school, a full 94% are those who did not join in some form of school activities (cited in The Call, December 12, 1985).

Consequently, it is important to examine the range of opportunities available for students to become involved in extra-curricular activities and the level of participation in those activities (Barker & Gump, 1964).

With respect to opportunity, larger schools may have a greater range of activities -- both academic and extra-curricular (Fox, 1981). But when extra-curricular activities are isolated, the types of activities are relatively constant across school size (Barker & Gump, 1964). However, because of the greater number of students in large schools, students from large schools have proportionately fewer opportunities to participate in those activities. Kleinert (1969) found that a moderately strong negative correlation (-.76) between high school size and the number of participants in extra-curricular activities. He concluded that "the larger the school, the poorer the extra-curricular offering per student."

A 1964 comparison of extra-curricular activities showed that students in small schools, on the average, participated in several times as many activities as did students of large schools. Based on these findings, further research based on a linear regression equation predicted that students in small schools would participate in an average of 7.6 different activities while students in the larger schools would average about 2.2 activities (Morgan & Alwin, 1980).

Not only does there seem to be more opportunity for participation, but there is also a greater opportunity in small schools for students to hold positions of responsibility and leadership within those activities. In studies of both high schools and junior high schools,

researchers have found a strong inverse relationship between school size and the number of leadership roles available to students (Kleinert, 1969; Wicker, 1969).

It appears that extra-curricular activities do have a positive influence on the quality of education. While the types of activities do not seem significantly different across school size, the level of participation and opportunities for leadership roles consistently favor the small school.

Graduate follow-up. There is a lack of agreement on the specific purposes of public education today. A variety of roles are seen for schools by various special interest groups of citizens. In general, however, certain broad objectives for American schools, and high schools in particular, can be stated (Clements, 1970):

1) good citizenship
2) vocational preparation
3) successful preparation for higher education
4) "preparation for life"

Good citizenship and "preparation for life" may be quite difficult to assess on a state-wide scale. Even more difficult may be attributing these two goals directly to schooling. Many factors outside the school may influence them. Vocational preparation and successful preparation for higher education, however, can be more directly linked as an outcome of public education.

The success with which high school graduates meet the demands of the job market or further their studies in higher education can be viewed as a measure of the quality of education (i.e. preparation) received. If one accepts the broad goals stated above, then measuring the degree of success in each is desirable.

As Clements (1970) points out, however, vocational preparation can be measured and compared only if 1) there is similar vocational needs and expectations in the various communities being compared, and 2) there is agreement that certain vocational needs should be fulfilled in high school.

While the percentage of students continuing on to higher education has often been cited, there has been no conclusive data relating the success in higher education with school size. Lathrop (1960), in a study of students from large and small high schools at Iowa State College, found that the size of the high school had no significant effect on achievement in college. Coker (1967) did find, however, that college students who were graduates of small high schools had significantly lower academic dropout rates and had somewhat higher high school class ranks. A further study (Clement, 1969) of 6,100 entering college freshman at Iowa State College, controlling for class rank, still found that the lowest percentage of college dropouts came from the smaller schools.

It should be noted that both of these studies were conducted at the same institution and that no statistical test of significance was applied. It does, however, indicate that simple comparisons of the percentage who go on to higher education may not be the most appropriate measure of a high school's successful preparation of graduates. Schooling should do more than merely provide a key to entrance into institutions of higher education. It must also provide the foundation for success once a student is admitted to those institutions. It seems most relevant to examine the quality of performance in higher education of graduates of small and large high schools.

Methodology

Sample selection. All public school districts in the state of Connecticut have been included in this research with the exception of the five major metropolitan districts: Bridgeport, Hartford, New Haven, Stamford, and Waterbury. Because of their unique urban circumstances, these districts are probably not typical of the other districts in the state. Hence, their inclusion in this study would most likely skew the results.

Districts were placed into one or more of the following groups:

1. Small District - total enrollment fewer than 2,500 students.

2. Large, Non-city District - total enrollment greater than 2,500 students.
3. Small High School - total enrollment fewer than 600 students or fewer than 150 students per grade.
4. Medium High School - total enrollment between 601 and 900 students or 150-225 students per grade.
5. Large High School - total enrollment greater than 900 students or greater than 225 students per grade.
6. Small District - No High School - enrollment fewer than 2,500 students and high school students are sent to other schools.

While these definitions are acknowledged to be somewhat arbitrary, readers should note that the literature does not provide any consistent distinctions with respect to ideal high school enrollment. Enrollments ranging from 450 to over 1,200 students have been reported as optimal for a comprehensive high school (e.g. Clements, 1970; Conant, 1967). The determination of the groupings for this study was influenced by the distribution of high school enrollments in Connecticut, the experience of the researchers, and a very general trend in the literature.

Due to the nature of the variables, it was necessary to utilize different groupings depending upon the data used in the respective analyses. The small district definition was used for the financial and Mastery Test comparisons because these variables are common to all districts in Connecticut.

The high school size definitions were used in comparisons of variables relating only to high schools. In conjunction with the high school groupings, the Small District - No High School group was added in studying the effects of school size on attendance due to the tendency of elementary schools to have slightly better attendance rates than high schools. Readers should note that some districts appear in the small district group for comparisons of financial and Mastery Test data due to their overall district enrollment, but appear in the medium high school group for comparisons of attendance and high school data because of the size of their high schools.

Research questions. Based on the review of literature and the availability of data from the Connecticut State Department of Education, this study was designed to answer the following specific research questions:

1. Is there a significant difference between small and large districts with respect to the cost of educating a student (Per Pupil Expenditure), to their ability to pay (Equalized Net Grand List Per Capita and Per Capita Income), and to their willingness to pay (Mean Educational Tax Rate)?

2. Is there a significant difference between small and large districts with respect to the percentage of students in need of additional help in math, reading, or writing as indicated by the 1985 Connecticut Fourth Grade Mastery Test?

3. Are there significant differences among districts with small, medium, large, or no high schools with respect to average daily attendance?

4. Are there significant differences among districts with small, medium, or large high schools with respect to ninth through twelfth grade persistence, achievement (Connecticut Ninth Grade Proficiency Examination), course offerings, high school staffing, or the follow-up of 1984 high school graduates?

Data collection. All data used in this study was obtained from the most recent data available from the Connecticut State Department of Education.

Statistical analyses. In order to answer the first and second research questions, t-tests were computed to determine if there were significant mean differences between small and large school districts with respect to the 1983 Equalized Net Grand List per Capita, the 1983 Per Capita Income, the 1984-85 Mean Educational Tax Rate, the 1984-85 Per Pupil Expenditures, and the mean percentage of students needing additional help in the areas of math, reading, and writing as indicated by the Connecticut Fourth Grade Mastery Test.

For the third and fourth research questions, the one-way analysis of variance procedure (ANOVA) was used in determining if there were any significant differences among small, medium, or large high schools with respect to ninth

through twelfth grade persistence, achievement (as indicated by the Connecticut Ninth Grade Proficiency Examination), course offerings, staffing, or the various categories of the 1984 Graduate Follow-up (per cent to higher education, per cent employed, per cent where status is known). In addition, small districts with no high schools were added as a fourth group to test for significant differences with respect to the average daily attendance rate.

Discussion

This section will present the results of the analyses in the following areas:

1) Costs
2) Staffing
3) Course offerings
4) Achievement
5) Attendance
6) Graduate follow-up.

Costs. One of the issues pervading the literature in comparing small and large districts is cost. Many feel that large districts are more cost-effective than small districts. This, however,is not borne out by the available data in Connecticut.

Table 1 presents comparisons between small and large districts with respect to selected financial variables (Mean Equalized Net Grand List, 1983; Mean Educational Tax Rate,

1984-85; Mean Per Pupil Expenditure, 1984-85; and Per Capita Income, 1983). Readers should note that the available data represent different years. Table 1 indicates that there are no significant differences between small and large districts with respect to the ability to pay for public education (ENGL per capita and Per Capita Income). However, even though these are not significantly different, large schools tend to have a higher mean ENGL per capita (by about $5,200) and a higher mean per capita income (by about $1,000). There is no significant difference between groups with respect to the mean Per Pupil Expenditure. There is, however, a significant difference between small and large districts with respect to the Mean Educational Tax Rate.

These findings indicate that small and large districts have equivalent resources per capita to fund public education (i.e. ability to pay). They also indicate that small and large districts spend an equivalent amount per pupil on instructional services. Small districts do, however, have a higher mean Educational Tax Rate, an index of local effort. (This is calculated by dividing the Net Current Local Education Expenditures by the Equalized Net Grand List.) Because this index is higher in small school districts, it would seem that taxpayers in small schools contribute a greater proportion of their school district budgets from local sources than do large districts.

It appears as though small and large districts have equivalent resources per capita and spend equivalent amounts on instructional services per pupil, but educational tax rates are higher in small districts. As many factors can influence these figures, further research is needed in the area of school finance before any conclusions can be drawn from the data.

Staffing. Table 2 contains the results of comparisons among small, medium, and large high schools with respect to the average number of staff in various categories per 1,000 students. Note that while there are no significant differences between medium and large high schools on any of the variables, there are a number of significant differences between small and large high schools, and small and medium high schools.

Small schools have significantly more content teachers per 1,000 students than do large high schools. Small high schools have significantly more vocational education teachers and total teachers per 1,000 students than do medium and large high schools. There are no significant differences among the groups with respect to support staff and administrators per 1,000 students. Small high schools have significantly more total high school staff per 1,000 students than do medium and large high schools. Readers should note that there is a consistent tendency for each

category per 1,000 students to decrease as school size increases.

From these data, it would appear that small schools, with more teachers per 1,000 students would have smaller ratios of students to teachers (16.5:1 compared with 18.7:1) Recall that studies on achievement have shown that significant increases in student achievement when student-teacher ratio falls below 15:1 (Glass & Smith, 1979). In light of that research, even though the differences between small and large districts with respect to content teachers is statistically significant, it probably has little practical significance in terms of enhancing achievement in small schools because ratios are still not lower than 15:1.

Because Per Pupil Expenditures were not significantly different (Table 1), it would seem that small high schools spend a larger portion of their instructional budget on teacher salaries than do medium and large high schools.

Small high schools have significantly more teachers with second teaching assignments (that is, teaching more than one subject) than do large high schools. Depending on one's viewpoint, this may be seen as an advantage or a disadvantage. On the one hand, teachers with second teaching assignments may be less likely to become very specialized in either content area. On the other hand, teachers with second

teaching assignments may be stimulated by having a more varied teaching load.

Course offerings. As noted in the review of literature, course offerings only provide a part of the overall curriculum picture. The number (or percentage) of students who actually complete the courses is an equally important issue. These two factors should be studied concurrently so that the relative importance of each can be weighed. Because this study used only available State Department of Education data, the focus will be on course offerings.

Table 3 contains comparisons among small, medium, and large high schools with respect to program offerings in the areas of the arts, vocational education, and foreign languages. Small high schools offer significantly fewer arts and foreign language courses than do medium and large high schools. There are no significant differences among any of the groups with respect to the average percentage of schools that offer vocational clubs or the average length in years of the longest foreign language sequence.

Small and medium high schools are not significantly different from each other with respect to the number of program offerings in vocational education. They do, however, offer significantly fewer vocational courses than do large high schools. Opportunities in the arts, vocational education, and foreign languages do favor the medium and large high schools.

Table 4 compares small, medium, and large high schools with respect to advanced course offerings. Small, medium, and large high schools do not differ significantly with respect to course offerings in calculus or computer programming. A significantly greater portion of the large high schools offer advanced placement social studies significantly more often than do small and medium high schools. Large high schools offer advanced placement science significantly more often than small high schools. Medium and large high schools also offer advanced English significantly more often than do small high schools.

Readers should note that in both Table 3 and Table 4 there is a tendency for the number of course offerings to increase as the size of the high school increases.

Achievement. Because schools are in the business of educating children, student achievement is the educational equivalent of a corporate "bottom line." In order to make comparisons on a state-wide basis, however, it is necessary to use achievement information common to all districts and all students. The Connecticut Fourth Grade Mastery Test and the Ninth Grade Proficiency Examination are such measures.

Table 5 compares small and large districts with respect to the mean percentage of student in need of further help in the areas of math, reading, and writing as indicated by the 1985 Connecticut Fourth Grade Mastery Test. Readers should note that there are no significant differences between small

and large school districts. Even though the means are not statistically different, small schools tend to have a slightly lower mean percentage of students in need of further help in each area.

Table 6 compares small, medium and large high schools with respect to mean scores and percentages of students above SLOEP (State Level Of Expected Proficiency) on the Ninth Grade Proficiency Examination. In no instance are there any significant differences among small, medium, or large high schools. However, medium high schools tended to have higher means then small and large high schools. Medium high schools also tended to have a higher percentage of students above SLOEP in language arts, reading, and writing.

The Fourth Grade Mastery Test and the Ninth Grade Proficiency Examination results indicate that small and large districts may do equally well educating their children in kindergarten through ninth grade. It would be reasonable to assume that if the districts are able to maintain equivalent levels of achievement in kindergarten through ninth grade, the years in which a student's study and work habits are formulated, they will be able to maintain that consistency in grades ten, eleven, and twelve. No evidence to support that contention is currently available.

Attendance. Although the review of literature found evidence that large schools have lower attendance rates than

small schools, it is not supported by the data in Connecticut.

Table 7 compares the means and standard deviations of the percentage of average daily attendance in small high school districts, medium high school districts, large high school districts, and small districts with no high schools. Small districts with no high schools have significantly better attendance rates than do the other groups. This may be due to elementary schools generally having better attendance rates than high schools. The fact that overall attendance rates in districts with high schools are lower may be due to the tendency of their high elementary attendance rates being pulled down by the lower high school attendance rates.

Graduate follow-up. The extent to which graduates go on to higher education or find employment is a partial measure of the success of the high school to prepare its students to meet the demands of society. In addition, the percentage of students who continue their education from grades nine through twelve is a partial measure of a high school's success in meeting the needs of its students and maintaining their interest in academic pursuits. Table 8 compares small, medium, and large high schools with respect to the percent who continue on to higher education or are employed, and the grade nine through twelve persistence rate. The percentage of students whose status was known is also compared.

There is a significant difference between small and large high schools with respect to the percentage of students continuing on to higher education.There are no significant differences among small, medium, and large high schools with respect to the percentage of graduates employed or the persistence rate. Note that the percentage of students continuing to higher education and the persistence rates tend to increase as high school size increases.

Conclusions and Recommendations

Readers should note that each of the areas discussed in this report could be the subject of a major research project. This report is meant to survey these areas, examining the general relationships of school size and each respective area. In addition to answering some relevant questions, it has also directed our attention to some specific areas for further investigation.

The cost indicators analyzed in this research (Mean Equalized Net Grand List Per Capita, Per Capita Income, and Mean Per Pupil Expenditure) do not differ significantly between small and large districts, but the Mean Educational Tax Rate does. What factors influence this difference?

Small high schools have significantly more content and vocational teachers per 1,000 students than large high schools even though small high schools have fewer vocational education course offerings. However, the amount spent on

instruction per pupil in small and large districts was found to be not significantly different. Teacher salaries account for a large portion of the instructional budget. If spending levels per pupil are not significantly different between small and large schools, what impact does having a proportionately larger teaching staff have on the other areas of the instructional budget?

There were significant differences between small, medium, and large high schools with respect to the percentage of schools offering courses in the arts, foreign languages, advanced placement science and social studies, and College Board, Honors, or UCONN English. Small high schools tended to offer fewer courses, but they also tended to have more staff per 1,000 students than medium and large high schools. Because some of these courses may have very limited enrollments, it is necessary to weigh the relative importance of these findings in relation to the number of students who actually take these courses.

No significant differences were found between small and large schools with respect to student achievement although there is a tendency for small or medium high schools to show higher test scores than large high schools. This finding is based upon the results of the Fourth Grade Mastery Test and the Ninth Grade Proficiency Examination.

Although elementary districts were found to have significantly higher attendance rates than districts with

high schools, there were no significant differences among small, medium, and large high schools.

It was found that a greater percentage of students from large high schools go on to higher education than do students from small high schools. Perhaps a better indicator of the quality of preparation of graduates than mere admission to higher education would be a comparison of students from small, medium, and large high schools with respect to their college academic performance and the percentage who actually graduate.

Summary of Major Findings

In summary, the major findings related to the specific research questions guiding this research are:

1. There is no significant difference between small and large districts with respect to the cost of educating a student (Per Pupil Expenditure), or the ability to pay (Equalized Net Grand List Per Capita and Per Capita Income). Small districts do pay a higher Educational Tax Rate than large districts.
2. There is no significant difference between small and large districts with respect to the percentage of students in need of additional help in math, reading, or writing as indicated by the 1985 Fourth Grade Mastery Test.

3. There are no significant differences among small, medium, or large high schools with respect to the average daily attendance. Small districts that have no high schools have a significantly higher average daily attendance than districts with small, medium, and large high schools.

4a. There are no significant differences among districts with small, medium, or large high schools with respect to ninth through twelfth grade persistence rates.

4b. There is are no significant differences among small, medium, or large high schools with respect to mean scores or the percentage of students above SLOEP on the Ninth Grade Proficiency Examination.

4c. Large high schools consistently offer more advanced courses than small or medium high schools.

4d. Small schools consistently have a larger number of high school staff per 1,000 students than large schools.

4e. Large high schools have a higher percentage of students who continue on to higher education than small high schools.

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Appendices

Appendix A

Small School Districts or Towns That Send Students to Small School Districts (n=104)

Andover
Ansonia
Ashford
Avon
Barkhamstead
Beacon Falls
Berlin
Bethany
Bethlehem
Bolton
Bozrah
Bridgewater
Brookfield
Brooklyn
Burlington
Canaan
Canterbury
Canton
Chaplin
Chester
Clinton
Colchester
Colebrook
Columbia
Cornwall
Coventry
Cromwell
Deep River
Derby
Durham
Eastford
East Granby
East Haddam
East Hampton
Easton
East Windsor
Ellington
Essex
Farmington
Franklin
Goshen
Granby
Griswold
Haddam
Hampton
Hartland
Harwinton
Hebron
Kent
Killingworth
Lebanon
Lisbon
Litchfield
Lyme
Mansfield
Marlborough
Middlefield
Morris
New Hartford
Norfolk
North Branford
North Canaan
North Stonington
Old Lyme
Old Saybrook
Orange
Oxford
Plainfield
Plymouth
Pomfret
Portland
Preston
Prospect
Putnam
Redding
Rocky Hill
Roxbury
Salem
Salisbury
Scotland
Seymour
Sharon
Sherman
Somers
Sprague
Stafford
Sterling
Stonington
Suffield
Thomaston
Thompson
Tolland
Union
Voluntown
Warren
Washington
Westbrook
Weston
Willington
Windsor Locks
Woodbridge
Woodbury
Woodstock

Note. The towns listed above either have school districts within the town with enrollments of fewer than 2,500 students or send their children to other districts which have enrollments of fewer than 2,500 students.

Appendix B

Large School Districts
(n=60)

Bethel
Bloomfield
Branford
Bristol
Cheshire
Danbury
Darien
East Hartford
East Haven
East Lyme
Enfield
Fairfield
Glastonbury
Greenwich
Groton
Guilford
Hamden
Killingly
Ledyard
Madison
Manchester
Meriden
Middlebury
Middletown
Milford
Monroe
Montville
Naugatuck
New Britain
New Canaan
New Fairfield
Newington
New London
New Milford
Newtown
North Haven
Norwalk
Norwich
Plainville
Ridgefield
Shelton
Simsbury
Southbury
Southington
South Windsor
Stratford
Torrington
Trumbull
Vernon
Wallingford
Waterford
Watertown
West Hartford
West Haven
Westport
Wethersfield
Wilton
Windham
Windsor
Wolcott

Note. The towns listed above either have school districts, or they feed school districts, with enrollments greater than 2,500 students.

Appendix C

Districts with Small or Medium High Schools

Small (n=36)	Medium (n=25)
Ansonia	Avon
Bolton	Berlin
Canton	Brookfield
Colchester	Clinton
Coventry	Farmington
Cromwell	Montville
Derby	New London
East Granby	North Branford
East Haddam	Plainfield
East Hampton	Plymouth
East Windsor	Seymour
Ellington	Stonington
Granby	Suffield
Griswold	Tolland
Lebanon	Waterford
Litchfield	Weston
North Stonington	Windsor Locks
Old Saybrook	Wolcott
Portland	Regional District 7
Putnam	Regional District 8
Rocky Hill	Regional District 9
Somers	Regional District 10
Stafford	Regional District 14
Thomaston	* E.O. Smith
Thompson	
Westbrook	
Regional District 1	
Regional District 4	
Regional District 6	
Regional District 11	
Regional District 12	
Regional District 13	
Regional District 17	
Regional District 18	
* Gilbert School	
* Woodstock Academy	

* These districts were not were not included in the 1984 Graduate Follow-up data.

Small high schools have fewer than 150 students per grade. Medium high schools have 150 to 225 students per grade.

Appendix D

School Districts with Large High Schools (n=55)

Bethel
Bloomfield
Branford
Bristol
Cheshire
Danbury
Darien
East Hartford
East Haven
East Lyme
Enfield
Fairfield
Glastonbury
Greenwich
Groton
Guilford
Hamden
Killingly
Ledyard
Madison
Manchester
Meriden
Middletown
Milford
Monroe
Naugatuck
New Britain
New Canaan
New Fairfield
Newington
New Milford
Newtown
North Haven
Norwalk
Ridgefield
Shelton
Simsbury
Southington
South Windsor
Stratford
Torrington
Trumbull
Vernon
Wallingford
Watertown
West Hartford
West Haven
Westport
Wethersfield
Wilton
Windham
Windsor
Regional District 5
Regional District 15
* Norwich Free Academy

* This high school not included in the 1984 Graduate Follow-up.

Large high schools have greater than 225 students per grade.

Appendix E

Small School Districts with No High Schools

Andover
Ashford
Barkhamstead
Bethany
Bozrah
Brooklyn
Canaan
Canterbury
Chaplin
Chester
Colebrook
Columbia
Cornwall
Deep River
Eastford
Easton
Essex
Franklin
Hampton
Hartland
Hebron
Kent
Lisbon
Mansfield
Marlborough
New Hartford
Norfolk
North Canaan
Orange
Oxford
Pomfret
Preston
Redding
Salem
Salisbury
Scotland
Sharon
Sherman
Sprague
Sterling
Union
Voluntown
Willington
Winchester
Woodbridge
Woodstock
Regional District 16

These districts have total enrollments of fewer than 2,500 students and have no high school.

Tables

Table 1

Selected Financial Comparisons[a]

Group	Mean Equalized Net Grand List per Capita 1983	Mean Educational Tax Rate 1984-85	Mean Per Pupil Expenditure 1984-85	Per Capita Income 1983
Small Schools (n=104)	$42,846 ($20,481 - $89,908)[b]	.0099 (.0046 - .0147)	$3,439 ($2,342 - $5,199)	$11,906 ($7,415 - $25,213)
Large, Non-city Schools (n=60)	$48,117 ($20,394 - $241,337)	.0093 (.0029 - .0127)	$3,604 ($2,626 - $5,349)	$12,983 ($8,175 - $28,055)
t	1.12	2.02 *	1.69	1.79

[a] Note that available data for the variables represents different years.

[b] The parentheses contain the minimum and maximum values.

* $p < .05$

Table 2

Mean Number of High School Staff per 1000 Students
1984-85

Category	Small Schools (n=36) Mean	S.D.	Medium Schools (n=25) Mean	S.D.	Large, Non-city Schools (n=55) Mean	S.D.
Content Area Teachers	60.57	12.13	55.41	7.29	53.44	7.16
Vocational Education Teachers	17.12	4.23	14.30	4.06	13.25	4.08
Total Teachers	83.88	15.66	75.50	7.56	71.94	9.82
Support Staff	6.04	2.23	5.83	1.72	6.22	1.71
Administrators	4.76	1.80	4.30	1.49	3.89	1.72
Total High School Staff	94.68	17.63	85.63	8.73	82.05	11.27
Percent with Second Teaching Assignment	15.43	10.15	10.87	7.57	8.58	6.88

Note. Underlined means for each category are not significantly different from each other. Thus, means for the same category that are not underlined by the same line are significantly different from each other ($p<.05$).

Table 3

Comparison of The Number of 1983 Program Offerings in Selected Areas in Small, Medium and Large, Non-city High Schools

Area	Small (n=36)		Medium (n=25)		Large, Non-city (n=55)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Arts	6.89	1.88	8.36	1.68	9.00	1.71
Vocational	5.06	1.43	5.76	1.81	7.65	2.44
Foreign Language	11.56	3.45	14.92	4.39	17.51	5.94

Average Percentage of Schools That Offer:

Area	Small (n=36)	Medium (n=25)	Large, Non-city (n=55)
	Mean	Mean	Mean
Vocational Clubs	61	64	80

Average Length in Years of Longest:

Area	Small (n=36)		Medium (n=25)		Large, Non-city (n=55)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Foreign Language Sequence	4.83	1.32	5.16	.80	5.25	1.46

Note. Underlined means for each area are not significantly different from each other. Thus, means for the same area that are not underlined by the same line are significantly different from each other ($p<.05$).

Table 4

Percentage of Schools Offering
Advanced Courses - 1983

Course	Small (n=36) Mean	Medium (n=25) Mean	Large, Non-city (n=55) Mean
Calculus	86%	92%	98%
Computer Programming	92%	88%	98%
Advanced Placement Social Studies	28%	32%	62%
Advanced Placement Science	31%	48%	67%
College Board, Honors, or UCONN English	39%	72%	84%

Note. Underlined means for each course are not significantly different from each other. Thus, means for the same course that are not underlined by the same line are significantly different from each other ($p<.05$).

Table 5

Mean Percentage of Students Needing Further Help in the Areas of Math, Reading, and Writing as Indicated by the 1985 Grade 4 State of Connecticut Mastery Test.

Area	Small Schools (n=94)	Large, Non-city Schools (n=59)	t
	Mean	Mean	
Math	12.8 %	14.1 %	1.06
Reading	22.7 %	25.0 %	1.22
Writing	14.0 %	14.4 %	.29

Note. None of the values for t are significant ($p<.05$).

Table 6

Comparison of Means and the Percentage of Students Above SLOEP by Subject on the Ninth Grade Proficiency Examination, 1984

Subject	Means			Percentage of Students Above SLOEP		
	Small Schools (n=36)	Medium Schools (n=25)	Large, Non-city Schools (n=55)	Small Schools (n=36)	Medium Schools (n=25)	Large, Non-city Schools (n=55)
Mathematics	84.43	84.72	84.38	95.17	94.71	93.92
Language Arts	90.89	91.45	91.01	97.89	98.17	97.80
Reading	80.49	80.83	80.47	98.20	98.74	98.31
Writing	5.81	5.84	5.81	96.46	97.10	96.25

Note. Underlined means for each subject are not significantly different from each other. Thus, means for the same subject that are not underlined by the same line are significantly different from each other ($p < .05$).

Table 7

Means and Standard Deviations for the Percentage of Average Daily Attendance October, 1984

School Category	n	Mean	S.D.
Small High School District	36	94.42	1.46
Medium High School District	24	94.49	1.30
Large, Non-city High School District	55	93.82	1.97
Small District, No High School	47	96.14 *	1.84

* This mean is significantly different from the other means ($F=18.85$, $df=3,158$, $p<.05$).

Table 8

Follow-up of 1984 High School Graduates

Category	Small Schools (n=34) Mean	S.D.	Medium Schools (n=24) Mean	S.D.	Large, Non-city Schools (n=54) Mean	S.D.
Continuing to Higher Education	51.3%	12.8%	58.3%	13.3%	61.6%	12.0%
Employed (of those seeking employment)	95.6%	7.2%	93.0%	12.0%	91.9%	11.8%
Status Known	97.7%	3.4%	98.5%	1.6%	96.6%	4.0%
Continuing grade 9 through grade 12	93.8%	12.5%	87.7%	10.7%	89.7%	11.3%

Note. Underlined means for each category are not significantly different from each other. Thus, means for the same category that are not underlined by the same line are significantly different from each other ($p<.05$).